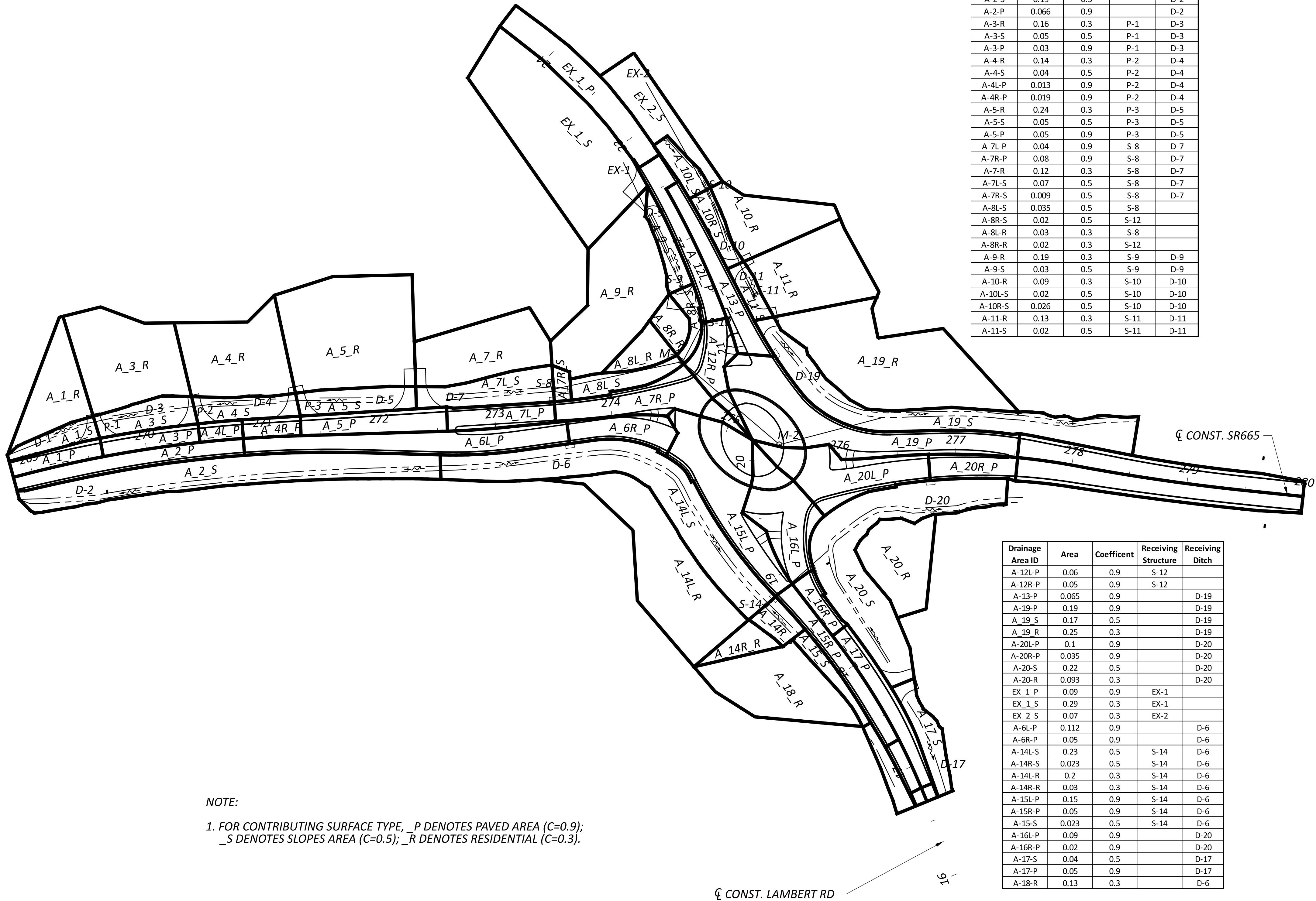


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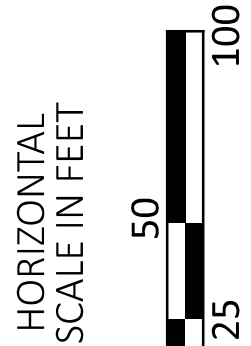
NOTE:

1. FOR CONTRIBUTING SURFACE TYPE, _P DENOTES PAVED AREA (C=0.9);
_S DENOTES SLOPES AREA (C=0.5); _R DENOTES RESIDENTIAL (C=0.3).

Drainage Area ID	Area	Coefficient	Receiving Structure	Receiving Ditch
A-1-R	0.08	0.3		D-1
A-1-S	0.027	0.5		D-1
A-1-P	0.027	0.9		D-1
A-2-S	0.19	0.5		D-2
A-2-P	0.066	0.9		D-2
A-3-R	0.16	0.3	P-1	D-3
A-3-S	0.05	0.5	P-1	D-3
A-3-P	0.03	0.9	P-1	D-3
A-4-R	0.14	0.3	P-2	D-4
A-4-S	0.04	0.5	P-2	D-4
A-4L-P	0.013	0.9	P-2	D-4
A-4R-P	0.019	0.9	P-2	D-4
A-5-R	0.24	0.3	P-3	D-5
A-5-S	0.05	0.5	P-3	D-5
A-5-P	0.05	0.9	P-3	D-5
A-7L-P	0.04	0.9	S-8	D-7
A-7R-P	0.08	0.9	S-8	D-7
A-7-R	0.12	0.3	S-8	D-7
A-7L-S	0.07	0.5	S-8	D-7
A-7R-S	0.009	0.5	S-8	D-7
A-8L-S	0.035	0.5	S-8	
A-8R-S	0.02	0.5	S-12	
A-8L-R	0.03	0.3	S-8	
A-8R-R	0.02	0.3	S-12	
A-9-R	0.19	0.3	S-9	D-9
A-9-S	0.03	0.5	S-9	D-9
A-10-R	0.09	0.3	S-10	D-10
A-10L-S	0.02	0.5	S-10	D-10
A-10R-S	0.026	0.5	S-10	D-10
A-11-R	0.13	0.3	S-11	D-11
A-11-S	0.02	0.5	S-11	D-11

Drainage Area ID	Area	Coefficient	Receiving Structure	Receiving Ditch
A-12L-P	0.06	0.9	S-12	
A-12R-P	0.05	0.9	S-12	
A-13-P	0.065	0.9		D-19
A-19-P	0.19	0.9		D-19
A_19_S	0.17	0.5		D-19
A_19_R	0.25	0.3		D-19
A-20L-P	0.1	0.9		D-20
A-20R-P	0.035	0.9		D-20
A-20-S	0.22	0.5		D-20
A-20-R	0.093	0.3		D-20
EX_1_P	0.09	0.9	EX-1	
EX_1_S	0.29	0.3	EX-1	
EX_2_S	0.07	0.3	EX-2	
A-6L-P	0.112	0.9		D-6
A-6R-P	0.05	0.9		D-6
A-14L-S	0.23	0.5	S-14	D-6
A-14R-S	0.023	0.5	S-14	D-6
A-14L-R	0.2	0.3	S-14	D-6
A-14R-R	0.03	0.3	S-14	D-6
A-15L-P	0.15	0.9	S-14	D-6
A-15R-P	0.05	0.9	S-14	D-6
A-15-S	0.023	0.5	S-14	D-6
A-16L-P	0.09	0.9		D-20
A-16R-P	0.02	0.9		D-20
A-17-S	0.04	0.5		D-17
A-17-P	0.05	0.9		D-17
A-18-R	0.13	0.3		D-6

DRAINAGE MAP



DESIGN AGENCY

Colliers

Engineering & Design

DESIGNER

XF

REVIEWER

SNH 08/23/24

PROJECT ID

116359

SHEET

P.1

TOTAL

1



INLET SPACING DESIGN

PID : 116359 **Date :** 11/18/2024 **Project :** SR 665 Roundabout

Location : North Exit / East Entrance Bypass

Description :

Designer : DTB

Rainfall Area: C

Storm Frequency (yr.) : 5

Total Allow. Spread (ft.) : 6.00

Allowable Depth (ft.) 0.25

STATION	C.B. Type	GUTTER LENGTH (ft.)	RUNOFF COEF	AREA (acres)	CONC. TIME (min.)	GUTTER TIME (min.)	TIME USED (min.)	LONG. SLOPE (ft./ft.)	GUTT. SLOPE (ft./ft.)	PAVT. SLOPE (ft./ft.)	GUTT. WIDTH (ft.)	LOCAL DEPRESS. (ft.)	RAIN FALL (in./hrs.)	INTERCPTD FLOW (cfs.)	BYPASS FLOW (cfs.)	TOTAL FLOW (cfs.)	DEPTH FLOW (ft.)	PAVT. SPREAD (ft.)
20+84	CB-3A	171.00	0.90	0.07	2.41	2.27	10.00	0.0050	0.0830	0.0160	2.00	0.0000	4.50	0.26	0.00	0.26	0.166	2.00
277+53	CB-3A	236.65	0.90	0.19	2.41	0.88	10.00	0.0700	0.0830	0.0160	2.00	0.0000	4.50	0.77	0.00	0.77	0.151	1.82



INLET SPACING DESIGN

PID : 116359 **Date :** 07/12/2024 **Project :** SR 665 Roundabout

Location : East Exit

Description :

Designer : DTB

Rainfall Area: C

Storm Frequency (yr.) : 5

Total Allow. Spread (ft.) : 6.00

Allowable Depth (ft.) 0.25

STATION	C.B. Type	GUTTER LENGTH (ft.)	RUNOFF COEF	AREA (acres)	CONC. TIME (min.)	GUTTER TIME (min.)	TIME USED (min.)	LONG. SLOPE (ft./ft.)	GUTT. SLOPE (ft./ft.)	PAVT. SLOPE (ft./ft.)	GUTT. WIDTH (ft.)	LOCAL DEPRESS. (ft.)	RAIN FALL (in./hrs.)	INTERCPTD FLOW (cfs.)	BYPASS FLOW (cfs.)	TOTAL FLOW (cfs.)	DEPTH FLOW (ft.)	PAVT. SPREAD (ft.)
277+53	CB-3A	175.39	0.90	0.14	2.41	0.71	10.00	0.0700	0.0830	0.0160	2.00	0.0000	4.50	0.55	0.00	0.55	0.133	1.60



INLET SPACING DESIGN

PID : 116359 **Date :** 07/12/2024 **Project :** SR 665 Roundabout

Location : North Entrance Sag

Description :

Designer : DTB

Rainfall Area: C

Storm Frequency (yr.) : 5

Total Allow. Spread (ft.) : 6.00

Allowable Depth (ft.) 0.25

STATION	C.B. Type	GUTTER LENGTH (ft.)	RUNOFF COEF	AREA (acres)	CONC. TIME (min.)	GUTTER TIME (min.)	TIME USED (min.)	LONG. SLOPE (ft./ft.)	GUTT. SLOPE (ft./ft.)	PAVT. SLOPE (ft./ft.)	GUTT. WIDTH (ft.)	LOCAL DEPRESS. (ft.)	RAIN FALL (in./hrs.)	INTERCPTD FLOW (cfs.)	BYPASS FLOW (cfs.)	TOTAL FLOW (cfs.)	DEPTH FLOW (ft.)	PAVT. SPREAD (ft.)	
22+35	Begin																		
21+28	CB-3	105.34	0.90	0.06	2.40	1.07	10.00	0.0104	0.0830	0.0160	2.00	0.0000	4.50	*****	*****	0.24	0.140	1.69	Sag
20+84	Begin																		
21+28	CB-3	46.90	0.67	0.09	3.77	0.54	10.00	0.0071	0.0830	0.0100	2.00	0.0000	4.50	*****	*****	0.27	0.157	1.89	End

SUMP DATA

Total Flow (cfs) : 0.52

Ponded Depth (ft.) : 0.041

Spread on Pavement (ft.) : 1.90



INLET SPACING DESIGN

PID : 116359 **Date :** 07/11/2024 **Project :** SR 665 Roundabout

Location : South Entrance Sag

Description :

Designer : DTB

Rainfall Area: C

Storm Frequency (yr.) : 5

Total Allow. Spread (ft.) : 6.00

Allowable Depth (ft.) 0.25

STATION	C.B. Type	GUTTER LENGTH (ft.)	RUNOFF COEF	AREA (acres)	CONC. TIME (min.)	GUTTER TIME (min.)	TIME USED (min.)	LONG. SLOPE (ft./ft.)	GUTT. SLOPE (ft./ft.)	PAVT. SLOPE (ft./ft.)	GUTT. WIDTH (ft.)	LOCAL DEPRESS. (ft.)	RAIN FALL (in./hrs.)	INTERCPTD FLOW (cfs.)	BYPASS FLOW (cfs.)	TOTAL FLOW (cfs.)	DEPTH FLOW (ft.)	PAVT. SPREAD (ft.)	
18+31	Begin																		
18+87	CB-3	56.02	0.90	0.02	2.41	0.82	10.00	0.0080	0.0830	0.0160	2.00	0.0000	4.50	*****	*****	0.08	0.098	1.17	Sag
19+53	Begin																		
18+87	CB-3	59.64	0.90	0.09	3.95	0.54	10.00	0.0109	0.0830	0.0160	2.00	0.0000	4.50	*****	*****	0.36	0.162	1.95	Sag



INLET SPACING DESIGN

PID : 116359 **Date :** 11/14/2024 **Project :** SR 665 Roundabout

Location : South Exit Sag

Description :

Designer : DTB

Rainfall Area: C

Storm Frequency (yr.) : 5

Total Allow. Spread (ft.) : 6.00

Allowable Depth (ft.) 0.25

STATION	C.B. Type	GUTTER LENGTH (ft.)	RUNOFF COEF (ft.)	AREA (acres)	CONC. TIME (min.)	GUTTER TIME (min.)	TIME USED (min.)	LONG. SLOPE (ft./ft.)	GUTT. SLOPE (ft./ft.)	PAVT. SLOPE (ft./ft.)	GUTT. WIDTH (ft.)	LOCAL DEPRESS. (ft.)	RAIN FALL (in./hrs.)	INTERCPTD FLOW (cfs.)	BYPASS FLOW (cfs.)	TOTAL FLOW (cfs.)	DEPTH FLOW (ft.)	PAVT. SPREAD (ft.)	
17+25	Begin																		
18+87	CB-3	160.42	0.47	0.20	2.41	1.54	10.00	0.0100	0.0830	0.0160	2.00	0.0000	4.50	*****	*****	0.43	0.175	2.55	Sag
20+15	Begin																		
18+87	CB-3	155.17	0.90	0.15	3.89	1.13	10.00	0.0170	0.0830	0.0160	2.00	0.0000	4.50	*****	*****	0.61	0.180	2.87	End

SUMP DATA

Total Flow (cfs) : 1.04

Ponded Depth (ft.) : 0.091

Spread on Pavement (ft.) : 4.56



INLET SPACING DESIGN

PID : 116359 Date : 07/10/2024 Project : SR 665 Roundabout

Location : West Entrance Sag

Description :

Designer : DTB

Rainfall Area: C

Storm Frequency (yr.) : 5

Total Allow. Spread (ft.) : 6.00

Allowable Depth (ft.) 0.25

STATION	C.B. Type	GUTTER LENGTH (ft.)	RUNOFF COEF	AREA (acres)	CONC. TIME (min.)	GUTTER TIME (min.)	TIME USED (min.)	LONG. SLOPE (ft./ft.)	GUTT. SLOPE (ft./ft.)	PAVT. SLOPE (ft./ft.)	GUTT. WIDTH (ft.)	LOCAL DEPRESS. (ft.)	RAIN FALL (in./hrs.)	INTERCPTD FLOW (cfs.)	BYPASS FLOW (cfs.)	TOTAL FLOW (cfs.)	DEPTH FLOW (ft.)	PAVT. SPREAD (ft.)	
270+83	Begin																		
273+62	CB-3	279.35	0.90	0.11	2.46	3.32	10.00	0.0063	0.0830	0.0160	2.00	0.0000	4.50	*****	*****	0.45	0.193	3.69	Sag
274+52	Begin																		
273+62	CB-3	86.64	0.90	0.06	2.73	1.33	10.00	0.0041	0.0830	0.0160	2.00	0.0000	4.50	*****	*****	0.24	0.167	2.05	End

SUMP DATA

Total Flow (cfs) : 0.70

Ponded Depth (ft.) : 0.060

Spread on Pavement (ft.) : 2.64



INLET SPACING DESIGN

PID : 116359 Date : 07/11/2024 Project : SR 665

Location : West Exit Sag

Description :

Designer : DTB

Rainfall Area: C

Storm Frequency (yr.) : 5

Total Allow. Spread (ft.) : 6.00

Allowable Depth (ft.) 0.25

STATION	C.B. Type	GUTTER LENGTH (ft.)	RUNOFF COEF	AREA (acres)	CONC. TIME (min.)	GUTTER TIME (min.)	TIME USED (min.)	LONG. SLOPE (ft./ft.)	GUTT. SLOPE (ft./ft.)	PAVT. SLOPE (ft./ft.)	GUTT. WIDTH (ft.)	LOCAL DEPRESS. (ft.)	RAIN FALL (in./hrs.)	INTERCPTD FLOW (cfs.)	BYPASS FLOW (cfs.)	TOTAL FLOW (cfs.)	DEPTH FLOW (ft.)	PAVT. SPREAD (ft.)	
272+59	Begin																		
273+52	CB-3	92.40	0.90	0.04	2.37	1.57	10.00	0.0035	0.0830	0.0160	2.00	0.0000	4.50	*****	*****	0.16	0.148	1.78	Sag
274+62	Begin																		
273+52	CB-3	123.18	0.68	0.15	4.02	2.04	10.00	0.0032	0.0830	0.0160	2.00	0.0000	4.50	*****	*****	0.44	0.213	4.94	End

SUMP DATA

Total Flow (cfs) : 0.60

Ponded Depth (ft.) : 0.051

Spread on Pavement (ft.) : 2.06



INLET SPACING DESIGN

PID : 116359 **Date :** 11/27/2027 **Project :** SR 665 Roundabout

Location : West Leg Bypass

Description :

Designer : SNH

Rainfall Area: C

Storm Frequency (yr.) : 5

Total Allow. Spread (ft.) : 6.00

Allowable Depth (ft.) 0.25

STATION	C.B. Type	GUTTER LENGTH (ft.)	RUNOFF COEF	AREA (acres)	CONC. TIME (min.)	GUTTER TIME (min.)	TIME USED (min.)	LONG. SLOPE (ft./ft.)	GUTT. SLOPE (ft./ft.)	PAVT. SLOPE (ft./ft.)	GUTT. WIDTH (ft.)	LOCAL DEPRESS. (ft.)	RAIN FALL (in./hrs.)	INTERCPTD FLOW (cfs.)	BYPASS FLOW (cfs.)	TOTAL FLOW (cfs.)	DEPTH FLOW (ft.)	PAVT. SPREAD (ft.)
270+83	Begin																	
268+90	CB-3A	190.52	0.90	0.07	2.12	2.28	10.00	0.0065	0.0830	0.0160	2.00	0.0000	4.50	0.27	0.00	0.27	0.159	1.91



STORM SEWER SYSTEM

PID : 116359 **Date :** 11/14/2024 **Project :** SR 665 Roundabout

Location : NE Storm Sewer

Description :

Designer : SNH

Rainfall Area: C

Just Full Capacity Frequency (yrs.) : 10

Hydraulic Gradient Frequency (yrs.) : 25

Minimum Pipe Size : 12.00

Tailwater Elevation (ft.): 0.00

JUNCTION		STATION		ΔAREA	ΔCA	BEGIN	RAINFALL		DISCHARGE		PIPE			F/L PIPE	MEAN	JUST FULL	FRICT	HYGR EL.	COVER	COVER	COVER	INLET TYPE
From	To	From	To	Σ AREA (acres)	Σ CA	TIME (min.)	INTENSITY (10 yrs.)	(25 yrs.)	(10 yrs.)	(25 yrs.)	DIAM. (in.)	LENGTH (ft.)	SLOPE (ft./ft.)	IN / OUT (ft.)	VEL (fps.)	CAPACITY (cfs.)	SLOPE (ft./ft.)	IN / OUT (ft.)	IN / OUT (ft.)	MINUS HY GR	MINUS CROWN	MANNING'S 'n'
11	10	21+34		0.15	0.05	15.00	4.43	5.16	0.2	0.3	12	99.4	0.0038	856.68	1.62	2.05	0.0001	856.93	859.18	2.25	1.50	CB 2-2B
	begin	22+30		0.15	0.05									856.30				856.90	859.11			0.015
10	EX2	22+30		0.14	0.05	16.03	4.29	5.03	0.4	0.5	12	105.5	0.0047	856.30	2.11	2.29	0.0003	856.63	859.11	2.48	1.81	CB 2-2B
	final	23+28		0.29	0.10									855.80				856.45	860.75			0.015



STORM SEWER SYSTEM

PID : 116359 Date : 11/14/2024 Project : SR 665 Roundabout

Location : East Outlet Storm Sewer

Description :

Designer : SNH

Rainfall Area: C

Just Full Capacity Frequency (yrs.) : 10

Hydraulic Gradient Frequency (yrs.) : 25

Minimum Pipe Size : 12.00

Tailwater Elevation (ft.): 0.00

JUNCTION From	STATION To	From To	Δ AREA Σ AREA (acres)	Δ CA Σ CA	BEGIN TIME (min.)	RAINFALL		DISCHARGE		PIPE			F/L PIPE IN / OUT (ft.)	MEAN VEL (fps.)	JUST FULL CAPACITY (cfs.)	FRICT SLOPE (ft./ft.)	HYGR EL. IN / OUT (ft.)	COVER IN / OUT (ft.)	COVER MINUS HY GR	COVER MINUS CROWN	INLET TYPE MANNING'S 'n'
						(10 yrs.)	(25 yrs.)	(10 yrs.)	(25 yrs.)	DIAM. (in.)	LENGTH (ft.)	SLOPE (ft./ft.)									
8	M1	273+53	0.38	0.21	15.00	4.43	5.02	0.9	1.0	12	112.5	0.0056	856.64	2.78	2.49	0.0011	857.67	859.14	1.47	1.50	CB 2-2B
	begin	274+53	0.38	0.21									856.01				857.54	861.35			0.015
EX1	9	22+87	0.38	0.17	15.00	4.43	5.02	0.7	0.8	12	118.4	0.0175	858.87	3.94	4.39	0.0007	859.18	860.87	1.69	1.00	CB 2-2B
	begin	21+64	0.76	0.38									856.80				857.74	859.59			0.015
9	12	21+64	0.24	0.09	15.50	4.36	5.02	1.1	1.3	12	39.2	0.0102	856.80	3.64	3.36	0.0017	857.74	859.59	1.85	1.79	CB 2-2B
		21+24	1.00	0.47									856.40				857.68	860.33			0.015
12	M1	21+24	0.13	0.12	15.68	4.34	5.02	1.6	1.9	12	35.7	0.0109	856.40	4.12	3.47	0.0037	857.68	860.33	2.65	2.93	CB 3
		274+53	1.13	0.58									856.01				857.54	861.35			0.015
M1	M2	274+53	0.00	0.00	15.82	4.32	5.02	2.5	2.9	12	112.2	0.0058	856.01	3.20	2.53	0.0089	857.54	861.35	3.81	4.34	MH 3
		275+48	1.13	0.58									855.36				856.54	861.04			0.015
M2	OUT	275+48	0.00	0.00	16.41	4.24	5.02	2.5	2.9	12	93.4	0.0056	855.36	3.14	2.48	0.0089	856.54	861.04	4.50	4.68	MH 3
	final	276+40	1.13	0.58									854.84				855.71	856.00			0.015



STORM SEWER SYSTEM

PID : 116359 Date : 11/14/2024 Project : SR 665 Roundabout

Location : SW Storm Sewer

Description :

Designer : SNH

Rainfall Area: C

Just Full Capacity Frequency (yrs.) : 10

Hydraulic Gradient Frequency (yrs.) : 25

Minimum Pipe Size : 12.00

Tailwater Elevation (ft.): 0.00

JUNCTION		STATION		ΔAREA	ΔCA	BEGIN	RAINFALL		DISCHARGE		PIPE			F/L PIPE	MEAN	JUST FULL	FRICT	HYGR EL.	COVER	COVER	COVER	INLET TYPE
From	To	From	To	Σ AREA (acres)	Σ CA	TIME (min.)	INTENSITY (10 yrs.)	(25 yrs.)	(10 yrs.)	(25 yrs.)	DIAM. (in.)	LENGTH (ft.)	SLOPE (ft./ft.)	IN / OUT (ft.)	VEL (fps.)	CAPACITY (cfs.)	SLOPE (ft./ft.)	IN / OUT (ft.)	IN / OUT (ft.)	MINUS HY GR	MINUS CROWN	MANNING'S 'n'
14	14A	18+86		0.71	0.40	15.00	4.43	5.26	1.8	2.1	12	70.4	0.0034	854.64	2.62	1.94	0.0047	855.64	856.64	1.00	1.00	CB 2-2B
	begin	18+80		0.71	0.40									854.40				855.21	855.70			0.015



STORM SEWER SYSTEM

PID : 116359 Date : 11/19/2024 Project : SR 665 Roundabout

Location : Driveway Pipe 1

Description :

Designer : SNH

Rainfall Area: C

Just Full Capacity Frequency (yrs.) : 10

Hydraulic Gradient Frequency (yrs.) : 25

Minimum Pipe Size : 12.00

Tailwater Elevation (ft.): 0.00

JUNCTION		STATION		ΔAREA	ΔCA	BEGIN	RAINFALL		DISCHARGE		PIPE			F/L PIPE	MEAN	JUST FULL	FRICT	HYGR EL.	COVER	COVER	COVER	INLET TYPE
From	To	From	To	Σ AREA (acres)	Σ CA	TIME (min.)	INTENSITY (10 yrs.)	(25 yrs.)	(10 yrs.)	(25 yrs.)	DIAM. (in.)	LENGTH (ft.)	SLOPE (ft./ft.)	IN / OUT (ft.)	VEL (fps.)	CAPACITY (cfs.)	SLOPE (ft./ft.)	IN / OUT (ft.)	IN / OUT (ft.)	MINUS HY GR	MINUS CROWN	MANNING'S 'n'
1	1A	269+76		0.79	0.33	15.00	4.43	5.31	1.5	1.8	12	30.7	0.0059	859.52	3.17	2.54	0.0032	860.22	860.52	0.30	0.00	HW Full He
	begin	269+46		0.79	0.33									859.34				860.12	860.34			0.015



STORM SEWER SYSTEM

PID : 116359 **Date :** 11/27/2024 **Project :** SR 665 Roundabout

Location : West Leg Existing 12" Pipe

Description :

Designer : SNH

Rainfall Area: C

Just Full Capacity Frequency (yrs.) : 10

Hydraulic Gradient Frequency (yrs.) : 25

Minimum Pipe Size : 12.00

Tailwater Elevation (ft.): 0.00

JUNCTION		STATION		ΔAREA	ΔCA	BEGIN	RAINFALL		DISCHARGE		PIPE			F/L PIPE	MEAN	JUST FULL	FRICT	HYGR EL.	COVER	COVER	COVER	INLET TYPE
From	To	From	To	Σ AREA (acres)	Σ CA	TIME (min.)	INTENSITY (10 yrs.)	(25 yrs.)	(10 yrs.)	(25 yrs.)	DIAM. (in.)	LENGTH (ft.)	SLOPE (ft./ft.)	IN / OUT (ft.)	VEL (fps.)	CAPACITY (cfs.)	SLOPE (ft./ft.)	IN / OUT (ft.)	IN / OUT (ft.)	MINUS HY GR	MINUS CROWN	MANNING'S 'n'
EX3	EX4	268+39		0.29	0.18	15.00	4.43	5.20	0.8	0.9	12	139.7	0.0066	857.74	2.81	2.70	0.0009	858.16	858.74	0.58	0.00	HW Full He
	begin	267+01		0.29	0.18									856.82				857.52	857.82			0.015



STORM SEWER SYSTEM

PID : 116359 **Date :** 12/13/2024 **Project :** SR 665 Roundabout

Location : South East Existing Pipe

Description :

Designer : SNH

Rainfall Area: C

Just Full Capacity Frequency (yrs.) : 10

Hydraulic Gradient Frequency (yrs.) : 25

Minimum Pipe Size : 12.00

Tailwater Elevation (ft.): 0.00

JUNCTION		STATION		ΔAREA	ΔCA	BEGIN	RAINFALL		DISCHARGE		PIPE		F/L PIPE	MEAN	JUST FULL	FRICT	HYGR EL.	COVER	COVER	COVER	INLET TYPE
From	To	From	To	Σ AREA	Σ CA	TIME	INTENSITY	(cfs.)	(10 yrs.)	(25 yrs.)	DIAM.	LENGTH	SLOPE	IN / OUT	VEL	CAPACITY	SLOPE	IN / OUT	IN / OUT	MINUS	MINUS
				(acres)		(min.)	(10 yrs.)	(25 yrs.)	(10 yrs.)	(25 yrs.)	(in.)	(ft.)	(ft./ft.)	(ft.)	(fps.)	(cfs.)	(ft./ft.)	(ft.)	(ft.)	HY GR	CROWN
EX5	EX6	280+00		1.52	1.33	15.00	4.43	5.31	5.9	7.0	12	75.8	0.0000	820.92	7.49	0.12	0.0521	825.85	821.92	-3.93	0.00
	begin	280+74		1.52	1.33						Warning			820.92				821.91	821.92		
																					HW Full He
																					0.015



DITCH ANALYSIS

PID : 116359 Date : 11/19/2024 Project : SR 665

Location : W Ditch (D-2)

Description :

Designer : SNH

Rainfall Area : C

Allowable Shears

	Seed:	0.40	Jute Mat:	0.45	Temporary Mat:	1.00
Permanent Mat	Type 1:	2.00	Type 2:	3.00	Type 3:	5.00
RCP	Type B:	6.00				

(*) Warning: Grade is steeper than allowable.

If value is parantheses, design parameters have been exceeded. - See user manual.

STATION		SIDE	LENGTH (ft.)	RADIUS WIDTH (ft.)	IN SLOPE (ft./ft.)	BACK SLOPE (ft./ft.)	GRADE (ft./ft.)	AREA (acres)	AREA SUM (acres)	RUNOFF COEFF.	CA (Sum)	PROTECT TYPE	RAIN INT. (in./hr.)	STORM FREQ. (yrs.)	MANN. COEFF.	TIME FLOW (min.)	VEL. FLOW (fps.)	SHEAR (lbs./ sq.ft.)	DESIGN FLOW (cfs.)	DEPTH FLOW (ft.)	WIDTH FLOW (ft.)
BEGIN	END																				
272+52	268+83	R	363.30	4.00	4.00	4.00	0.0042	0.26	0.26	0.60	0.15	Seed	6.47	10	0.030	5.45	1.00	0.05	0.99	0.21	5.65
												Seed	4.98	5	0.040	7.18	0.75	0.06	0.76	0.21	5.68



DITCH ANALYSIS

PID : 116359 Date : 11/19/2024 Project : SR 665

Location : SW Ditch (D-6)

Description :

Designer : SNH

Rainfall Area : C

Allowable Shears

	Seed:	0.40	Jute Mat:	0.45	Temporary Mat:	1.00
Permanent Mat	Type 1:	2.00	Type 2:	3.00	Type 3:	5.00
RCP	Type B:	6.00				

(*) Warning: Grade is steeper than allowable.

If value is parantheses, design parameters have been exceeded. - See user manual.

STATION BEGIN	STATION END	SIDE	LENGTH (ft.)	RADIUS WIDTH (ft.)	IN SLOPE (ft./ft.)	BACK SLOPE (ft./ft.)	GRADE (ft./ft.)	AREA (acres)	AREA SUM (acres)	RUNOFF COEFF.	CA (Sum)	PROTECT TYPE	RAIN INT. (in./hr.)	STORM FREQ. (yrs.)	MANN. COEFF.	TIME FLOW (min.)	VEL. FLOW (fps.)	SHEAR (lbs./ sq.ft.)	DESIGN FLOW (cfs.)	DEPTH FLOW (ft.)	WIDTH FLOW (ft.)
272+52	273+62	R	112.60	4.00	4.00	4.00	0.0042	0.07	0.07	0.50	0.03	Seed	7.42	10	0.030	2.88	0.61	0.02	0.24	0.09	4.73
												Seed	5.69	5	0.040	3.80	0.47	0.02	0.19	0.09	4.73
273+62	Concent							0.16		0.90	0.18					10.00					
273+62	19+59	R	136.30	4.00	4.00	4.00	0.0111	0.15	0.38	0.42	0.24	Seed	5.00	10	0.030	11.50	1.48	0.12	1.21	0.17	5.40
												Seed	4.23	5	0.040	11.92	1.15	0.13	1.02	0.19	5.49
19+59	18+86	L	94.50	4.00	4.00	4.00	0.0312	0.21	0.59	0.37	0.32	Seed	4.88	10	0.030	12.20	2.27	0.29	1.55	0.15	5.19
												Seed	4.11	5	0.040	12.81	1.77	0.31	1.31	0.16	5.28



DITCH ANALYSIS

PID : 116359 Date : 11/20/2024 Project : SR 665

Location : SE Ditch (D-20)

Description :

Designer : SNH

Rainfall Area : C

Allowable Shears

	Seed:	0.40	Jute Mat:	0.45	Temporary Mat:	1.00
Permanent Mat	Type 1:	2.00	Type 2:	3.00	Type 3:	5.00
RCP	Type B:	6.00				

(*) Warning: Grade is steeper than allowable.

If value is parantheses, design parameters have been exceeded. - See user manual.

STATION BEGIN	STATION END	SIDE	LENGTH (ft.)	RADIUS WIDTH (ft.)	IN SLOPE (ft./ft.)	BACK SLOPE (ft./ft.)	GRADE (ft./ft.)	AREA (acres)	AREA SUM (acres)	RUNOFF COEFF.	CA (Sum)	PROTECT TYPE	RAIN INT. (in./hr.)	STORM FREQ. (yrs.)	MANN. COEFF.	TIME FLOW (min.)	VEL. FLOW (fps.)	SHEAR (lbs./ sq.ft.)	DESIGN FLOW (cfs.)	DEPTH FLOW (ft.)	WIDTH FLOW (ft.)
17+86	18+82	R	99.50	2.00	4.00	4.00	0.0369	0.10	0.10	0.50	0.05	Seed	8.39	10	0.030	0.90	1.80	0.23	0.43	0.10	2.79
												Seed	6.39	5	0.040	1.18	1.37	0.23	0.33	0.10	2.79
18+82	Concent							0.11		0.90	0.15					10.00					
18+95	Concent							0.71		0.56	0.55					15.00					
18+82	276+30	R	60.55	4.00	4.00	4.00	0.0150	0.14	1.07	0.45	0.61	Seed	4.37	10	0.030	15.47	2.13	0.24	2.67	0.25	6.01
												Seed	3.78	5	0.040	15.60	1.67	0.26	2.32	0.27	6.18
276+30	276+80	R	49.60	4.00	4.00	4.00	0.0750	0.03	1.10	0.30	0.62	Seed	4.34	10	0.030	15.70	3.64	0.75	2.70	0.16	5.28
												Jute Mat	4.33	10	0.040	15.75	3.02	0.88	2.70	0.19	5.50
												Temp. Mat	4.33	10	0.040	15.75	3.02	0.88	2.70	0.19	5.50
												Temp. Mat	3.75	5	0.040	15.89	2.87	0.81	2.33	0.17	5.39
276+80	Concent							0.10		0.90	0.71					10.00					
276+78	277+61	R	77.75	4.00	4.00	4.00	0.0810	0.04	1.24	0.50	0.73	Seed	4.28	10	0.030	16.07	3.94	0.86	3.15	0.17	5.36
												Jute Mat	4.28	10	0.040	16.14	3.26	1.02	3.14	0.20	5.61



DITCH ANALYSIS

STATION BEGIN	STATION END	SIDE	LENGTH (ft.)	RADIUS (ft.)	IN SLOPE (ft./ft.)	BACK SLOPE (ft./ft.)	GRADE (ft./ft.)	AREA (acres)	AREA SUM (acres)	RUNOFF COEFF.	CA (Sum)	PROTECT TYPE	RAIN INT. (in./hr.)	STORM FREQ. (yrs.)	MANN. COEFF.	TIME FLOW (min.)	VEL. FLOW (fps.)	SHEAR (lbs./ sq.ft.)	DESIGN FLOW (cfs.)	DEPTH FLOW (ft.)	WIDTH FLOW (ft.)
												Temp. Mat	4.28	10	0.040	16.14	3.26	1.02	3.14	0.20	5.61
												Perm, Type 1	4.28	10	0.040	16.14	3.26	1.02	3.14	0.20	5.61
												Perm, Type 1	3.70	5	0.040	16.30	3.10	0.94	2.72	0.19	5.48
277+61	279+61	R	204.11	0.00	2.00	4.00	0.1083 *	0.23	1.47	0.64	0.88	Seed	4.20	10	0.030	16.72	5.87	3.10	3.71	0.46	2.75
												Jute Mat	4.18	10	0.040	16.86	4.72	3.45	3.69	0.51	3.06
												Temp. Mat	4.18	10	0.040	16.86	4.72	3.45	3.69	0.51	3.06
												Perm, Type 1	4.18	10	0.040	16.86	4.72	3.45	3.69	0.51	3.06
												Perm, Type 2	4.18	10	0.040	16.86	4.72	3.45	3.69	0.51	3.06
												Perm, Type 3	4.18	10	0.040	16.86	4.72	3.45	3.69	0.51	3.06
												Perm, Type 3	3.63	5	0.040	17.05	4.57	3.27	3.20	0.48	2.90



DITCH ANALYSIS

PID : 116359 Date : 11/20/2024 Project : SR 665

Location : NE Ditch (D-19)

Description :

Designer : SNH

Rainfall Area : C

Allowable Shears

	Seed:	0.40	Jute Mat:	0.45	Temporary Mat:	1.00
Permanent Mat	Type 1:	2.00	Type 2:	3.00	Type 3:	5.00
RCP	Type B:	6.00				

(*) Warning: Grade is steeper than allowable.

If value is parantheses, design parameters have been exceeded. - See user manual.

STATION BEGIN	STATION END	SIDE	LENGTH (ft.)	RADIUS WIDTH (ft.)	IN SLOPE (ft./ft.)	BACK SLOPE (ft./ft.)	GRADE (ft./ft.)	AREA (acres)	AREA SUM (acres)	RUNOFF COEFF.	CA (Sum)	PROTECT TYPE	RAIN INT. (in./hr.)	STORM FREQ. (yrs.)	MANN. COEFF.	TIME FLOW (min.)	VEL. FLOW (fps.)	SHEAR (lbs./ sq.ft.)	DESIGN FLOW (cfs.)	DEPTH FLOW (ft.)	WIDTH FLOW (ft.)
20+82	Concent							0.07		0.90	0.06						10.00				
21+00	276+37	R	119.90	4.00	4.00	4.00	0.0387	0.18	0.25	0.37	0.13	Seed	5.07	10	0.030	11.12	1.76	0.20	0.64	0.08	4.67
												Seed	4.30	5	0.040	11.41	1.39	0.21	0.54	0.09	4.71
276+37	Concent							1.06		0.51	0.66						16.80				
276+37	277+54	L	122.70	4.00	4.00	4.00	0.0631	0.19	1.49	0.36	0.73	Seed	4.12	10	0.030	17.37	3.58	0.70	3.01	0.18	5.43
												Jute Mat	4.11	10	0.040	17.49	2.94	0.83	3.00	0.21	5.69
												Temp. Mat	4.11	10	0.040	17.49	2.94	0.83	3.00	0.21	5.69
												Temp. Mat	3.58	5	0.040	17.52	2.82	0.77	2.62	0.19	5.56
277+54	Concent							0.19		0.90	0.90						10.00				
277+54	278+50	L	100.00	4.00	3.00	4.00	0.1121 *	0.10	1.78	0.67	0.97	Seed	4.06	10	0.030	17.83	4.78	1.24	3.93	0.18	5.25
												Jute Mat	4.05	10	0.040	17.91	3.96	1.47	3.92	0.21	5.47
												Temp. Mat	4.05	10	0.040	17.91	3.96	1.47	3.92	0.21	5.47
												Perm, Type 1	4.05	10	0.040	17.91	3.96	1.47	3.92	0.21	5.47



DITCH ANALYSIS

STATION BEGIN	STATION END	SIDE	LENGTH (ft.)	RADIUS WIDTH (ft.)	IN SLOPE (ft./ft.)	BACK SLOPE (ft./ft.)	GRADE (ft./ft.)	AREA (acres)	AREA SUM (acres)	RUNOFF COEFF.	CA (Sum)	PROTECT TYPE	RAIN INT. (in./hr.)	STORM FREQ. (yrs.)	MANN. COEFF.	TIME FLOW (min.)	VEL. FLOW (fps.)	SHEAR (lbs./ sq.ft.)	DESIGN FLOW (cfs.)	DEPTH FLOW (ft.)	WIDTH FLOW (ft.)
												Perm, Type 1	3.54	5	0.040	17.96	3.77	1.36	3.42	0.19	5.36
278+50	279+03	L	52.00	0.00	2.00	4.00	0.1300 *	0.06	1.84	0.62	1.01	Seed	4.04	10	0.030	18.04	6.43	3.73	4.07	0.46	2.76
												Jute Mat	4.04	10	0.040	18.07	5.19	4.14	4.07	0.51	3.07
												Temp. Mat	4.04	10	0.040	18.07	5.19	4.14	4.07	0.51	3.07
												Perm, Type 1	4.04	10	0.040	18.07	5.19	4.14	4.07	0.51	3.07
												Perm, Type 2	4.04	10	0.040	18.07	5.19	4.14	4.07	0.51	3.07
												Perm, Type 3	4.04	10	0.040	18.07	5.19	4.14	4.07	0.51	3.07
												Perm, Type 3	3.52	5	0.040	18.13	5.01	3.94	3.55	0.49	2.92

NOTICE OF INTENT (NOI) ACREAGE CALCULATION FORM	1112-1
	Reference Section 1112

		Area (acres)
Project Earth Disturbing Activities		3.05
If the project is a Routine Maintenance Project, an NOI is not required. (See Section 1112)		
Contractor Earth Disturbing Activities		
Field Office per CMS Item 619: Enter 0.125 for Type A; 0.25 for Type B; or 1.00 for Type C		0.25
Batch Plant: Yes = 2.0; No = 0		0.00
Off-Project Waste / Borrow Pit: Add 1.0 acre per 15,000 CY of waste or borrow		
Miscellaneous Other Off-Project Areas: Off-Project staging areas, stock yards, etc.		0.00
Contractor Earth Disturbing Activities	Subtotal	0.25
Total Earth Disturbing Activities (add Project EDA and Contractor EDA)	TOTAL	3.30
NOI Earth Disturbing Activities (see below to determine value)	TOTAL	3.50

Project Earth Disturbing Activities - Enter the area of earth disturbing activities directly related to project activities. Earth disturbing activity is defined as any activity that exposes bare ground or an erodible material to storm water as well as anywhere Item 659 Seeding, or Item 660 Sodding is being furnished.

Contractor Earth Disturbing Activities:

Field Office - These sizes were determined with regard to size of the trailer, parking, and some stock area for equipment and materials based on Item 619 Field Office.

Batch Plant - It is assumed that a typical batch plant would occupy 2 acres of ground. The designer should investigate the location of the project relative to existing plants, facilities, etc. to estimate whether a batch plant might be used by the Contractor. This is not needed for existing plants, it is only for plants set up for the specific project.

Off-Project Waste / Borrow - The specified estimation is based on approximately 10 feet of depth or fill over 1 acre. The designer may choose a different value based on knowledge of the project area, bedrock elevations, previous projects, etc. Consideration should be given for grindings, as well. (10ft. x 43560 s.f. / 27 = 16,133 c.y. ~ 15,000 c.y.)

NOI Earth Disturbing Activities - This is the combined Project and Contractor Earth Disturbed Area. Based on project conditions and activities, some flexibility in the area calculation should be provided to avoid the possibility of the estimated work being less than the actual work. This scenario would require submittal of an NOI for projects originally calculated to be less than one acre during construction.

For projects with Total EDA less than one acre: No NOI is required.

A Routine Maintenance Project consists of activities that do not change the line, grade, or hydraulic capacity of the existing condition and has less than 5 acres of earth disturbing activities (see section 1112.2).



Ohio Department of Transportation - Office of Hydraulic Engineering

Post-Construction BMP Calculation Spreadsheet

Post Construction - Project Summary

Project Data

Project EDA	3.05	acres
Is the Project Routine Maintenance per L&D Vol. 2, Sec. 1112.2	No	
BMPs Required?	BMPs Required	NA
Ain (New Impervious Area in New Permanent R/W	0.14	acres
Does Entire Site Drain to Large River (>100 sq. miles)?	No	
Water Quality Treatment Required	Yes	
Water Quantity Treatment Required	No	

Treatment Percent and Treatment Requirement

Aix (Project EDA that is inside the existing right-of-way)	2.47	acres
Ain (New Impervious Area in New Permanent R/W)	0.14	acres
T% (Treatment Percent)	24.29	%
Treatment Requirement	0.74	acres

BMPs Provided

BMP Name	BMP Type	Contributing Drainage Area (acres)	Contributing Drainage Area in ODOT R/W (acres)
VBF1	Vegetated Biofilter	0.19	0.19
VBF2	Vegetated Biofilter	0.43	0.27
VBF3	Vegetated Biofilter	0.24	0.11
VBF4	Vegetated Biofilter	0.21	0.12
VBF5	Vegetated Biofilter	0.33	0.15

Treatment Provided

Total Area with ODOT R/W Treated (acres)	0.84
Treatment Requirements (acres)	0.74
Treatment Check	Good

BMP Submittal Requirements (Per L&D, Vol. 2, Sec. 1116.2)

1. Estimated Project Earth Disturbed Area	Yes	Good
2. Treatment Percent Calculation	Yes	Good
3. BMP Selected for use	Yes	Good
4. Drainage area mapping for post-construction BMPs that show the total contributing drainage area and the amount of contributing area within ODOT right-of-way	Yes	Good
5. Plan sheets showing locations of post-construction BMP	Yes	Good
6. Calculations for each BMP	Yes	Good
7. Explanation for any area that is not treated	Yes	Good



Ohio Department of Transportation - Office of Hydraulic Engineering
Post-Construction BMP Calculation Spreadsheet

Vegetated Biofilter

Location Information					Hydrology			Channel Characteristics					Analysis Results			
VBF	Route	Begin Station	End Station	Side	Total Drainage Area (acres)	EDA Treatment Credit (acres) ¹	WQ _F (cfs)	VBF Bottom Width (ft) ^{note2}	VBF Fore Slope (z:1)	VBF Back Slope (z:1)	VBF Longitudinal Slope (ft/ft)	Manning's Roughness Coefficient ³	Depth of Runoff at WQ _F (inches) ⁴	Velocity of Runoff at WQ _F (ft/sec) ⁴	Standard Ditch Width (feet) ⁵	Required Ditch Width (feet)
VBF#1	SR 665	268+83	272+52	RT	0.19	0.19	0.077	4	4	4	0.004	0.15	1.45	0.14	4	4
VBF#2	SR 665 / Lambert	272+52	18+88	RT	0.43	0.27	0.122	4	4	4	0.010	0.15	1.45	0.23	4	4
VBF#3	SR 665	269+61	270+47	LT	0.24	0.11	0.088	4	4	4	0.005	0.15	1.46	0.16	4	4
VBF#4	SR 665	270+47	271+30	LT	0.21	0.12	0.089	4	4	4	0.005	0.15	1.47	0.16	4	4
VBF#5	SR 665	271+30	272+32	LT	0.33	0.15	0.124	4	4	4	0.005	0.15	1.79	0.18	4	4
VBF#6												0.15				
VBF#7												0.15				
VBF#8												0.15				
VBF#9												0.15				
VBF#10												0.15				

Total Treatment Credit Earned from VBFs (within R/W): 0.84 acres
 (Treatment is for quality only, not quantity)

Yellow: Requires Input (See instructions tab)

BMP Design Considerations

1	Do the VBF characteristics match the calculated flow and velocity checks using Manning's Equation above?	Yes	Good
2	Is the VBF a trapezoidal ditch with a flat bottom, not a radius ditch?	Yes	Good
3	Is the VBF width at least 4 feet?	Yes	Good
4	Is the depth of runoff for the WQ _F for each VBF less than or equal to 4 inches?	Yes	Good
5	Is the velocity of runoff for the WQ _F for each VBF less than or equal to 1.0 ft/sec?	Yes	Good
6	Does the "Total Drainage Area" include all onsite and off-site drainage to the VBF?	Yes	Good
7	Does each VBF include 4" of Item 659 Topsoil on the vegetated portion of the shoulder and foreslope?	Yes	Good
8	Does each VBF include Item 670, Ditch Erosion Protection?	Yes	Good
9	Are the station ranges and locations of the VBFs labeled on the Project Site Plan drawing?	Yes	Good



Water Quality Flow Rate (WQ_F)

Drainage Area #1	Area (acres)	Coefficient of Runoff (C)
Tributary Area within Existing R/W	0.06	0.9
Impervious Trib. Area Outside Existing R/W		0.9
Tributary Area Land Use #3	0.13	0.5
Tributary Area Land Use #4		
Total Tributary Area	0.19	0.618
BMP Type	Vegetated Biofilter	
Time of Concentration (minutes)	NA	
Intensity, i (in/hr)	0.65	
Water Quality Flow (WQ _F)	0.077	cfs

Drainage Area #2	Area (acres)	Coefficient of Runoff (C)
Tributary Area within Existing R/W	0.04	0.9
Impervious Trib. Area Outside Existing R/W		0.9
Tributary Area Land Use #3	0.19	0.5
Tributary Area Land Use #4	0.20	0.3
Total Tributary Area	0.43	0.441
BMP Type	Vegetated Biofilter	
Time of Concentration (minutes)	NA	
Intensity, i (in/hr)	0.65	
Water Quality Flow (WQ _F)	0.122	cfs

Drainage Area #3	Area (acres)	Coefficient of Runoff (C)
Tributary Area within Existing R/W	0.11	0.9
Impervious Trib. Area Outside Existing R/W		0.9
Tributary Area Land Use #3	0.13	0.3
Tributary Area Land Use #4		
Total Tributary Area	0.24	0.575
BMP Type	Vegetated Biofilter	
Time of Concentration (minutes)	NA	
Intensity, i (in/hr)	0.65	
Water Quality Flow (WQ _F)	0.088	cfs

Drainage Area #4	Area (acres)	Coefficient of Runoff (C)
Tributary Area within Existing R/W	0.12	0.9
Impervious Trib. Area Outside Existing R/W		0.9
Tributary Area Land Use #3	0.09	0.3
Tributary Area Land Use #4		
Total Tributary Area	0.21	0.643
BMP Type	Vegetated Biofilter	
Time of Concentration (minutes)	NA	
Intensity, i (in/hr)	0.65	
Water Quality Flow (WQ _F)	0.089	cfs



Water Quality Flow Rate (WQ_F)

Drainage Area #5	Area (acres)	Coefficient of Runoff (C)
Tributary Area within Existing R/W	0.15	0.9
Impervious Trib. Area Outside Existing R/W		0.9
Tributary Area Land Use #3	0.18	0.3
Tributary Area Land Use #4		
Total Tributary Area	0.33	0.578
BMP Type	Vegetated Biofilter	
Time of Concentration (minutes)	NA	
Intensity, i (in/hr)	0.65	
Water Quality Flow (WQ _F)	0.124	cfs